



A satellite view of Earth from space, showing the Western Hemisphere. The top half of the image shows the Americas, with North America in the upper left and South America in the lower left. The bottom half shows the Atlantic and Pacific Oceans. A semi-transparent grey bar is overlaid on the bottom half of the image, containing the event title and date. A solid blue horizontal bar is positioned above the main title.

NOAA – Technical Session

**International Symposium on Remote Sensing of Environment
May 11, 2015**

NOAA Satellite and Information Service

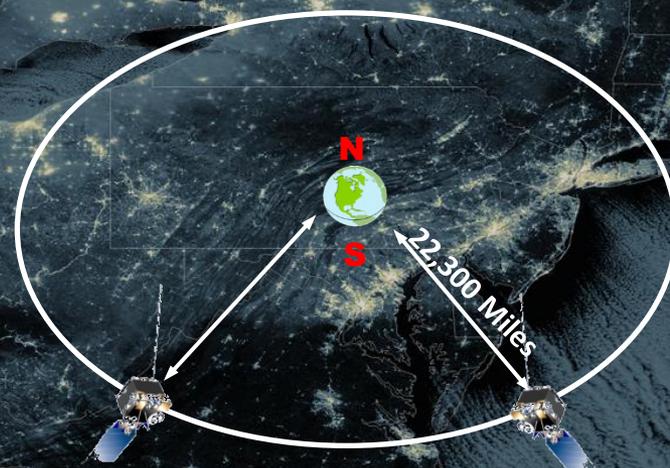
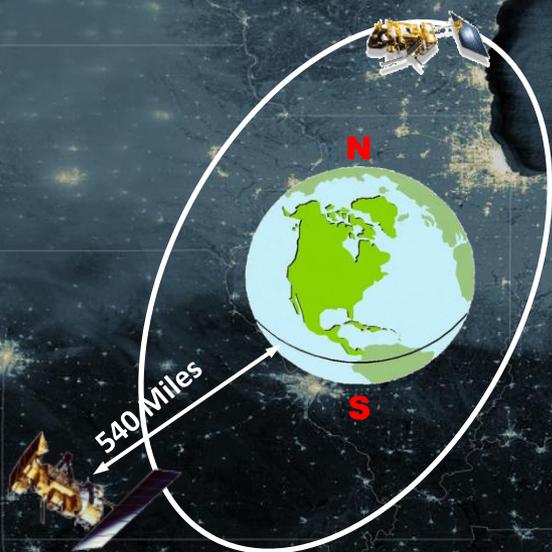
Dr. Stephen Volz, Assistant Administrator



NOAA's Observational Paradigm Has Been: Two Orbits, One Mission

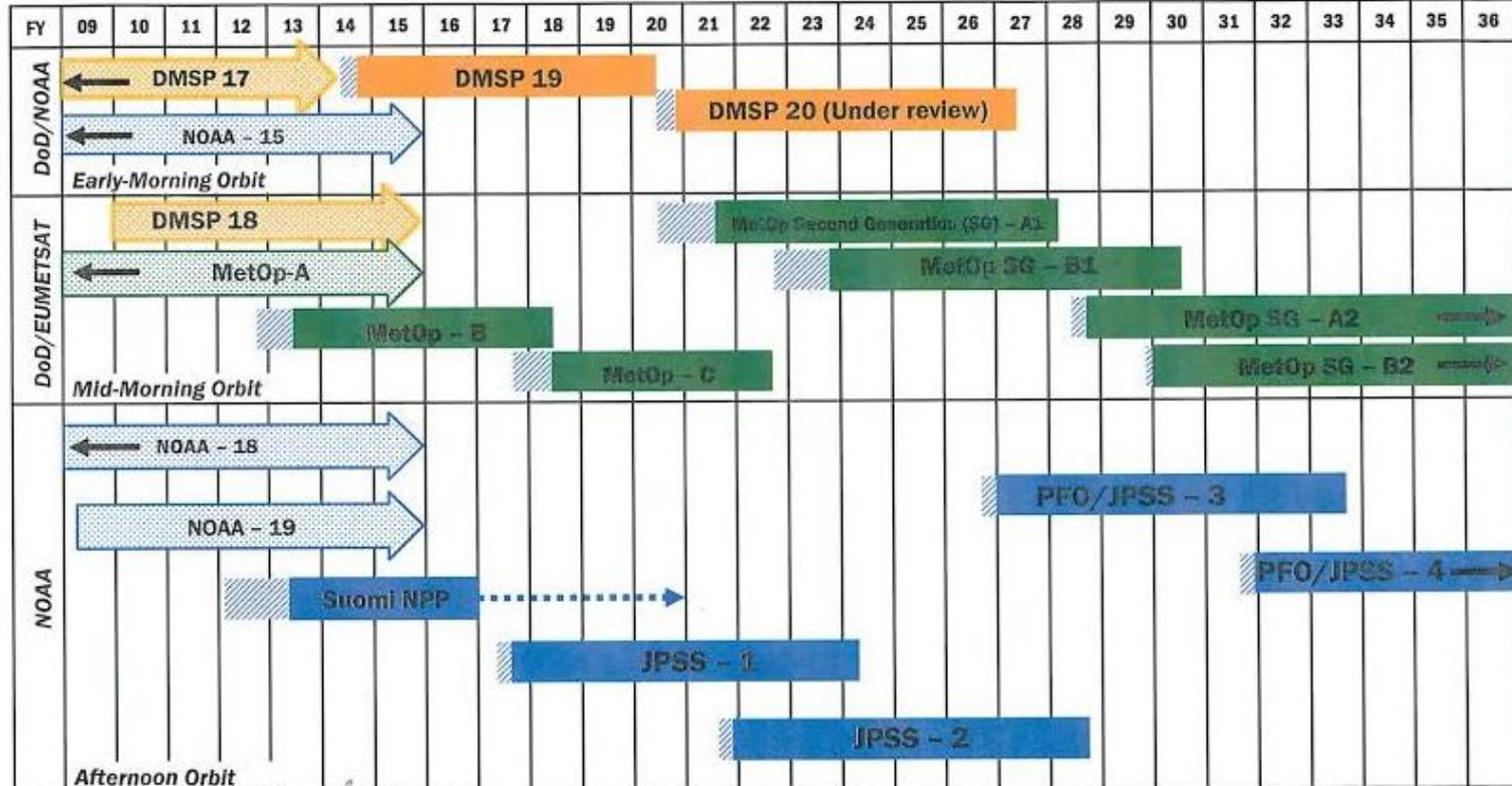
**Polar-orbiting Operational
Environmental Satellites (POES)
Followed by S-NPP and JPSS-1 thru -4**

**Geostationary Operational
Environmental Satellites (GOES),
Followed by GOES-R thru -U**



Polar Flyout Chart

As of April 2015



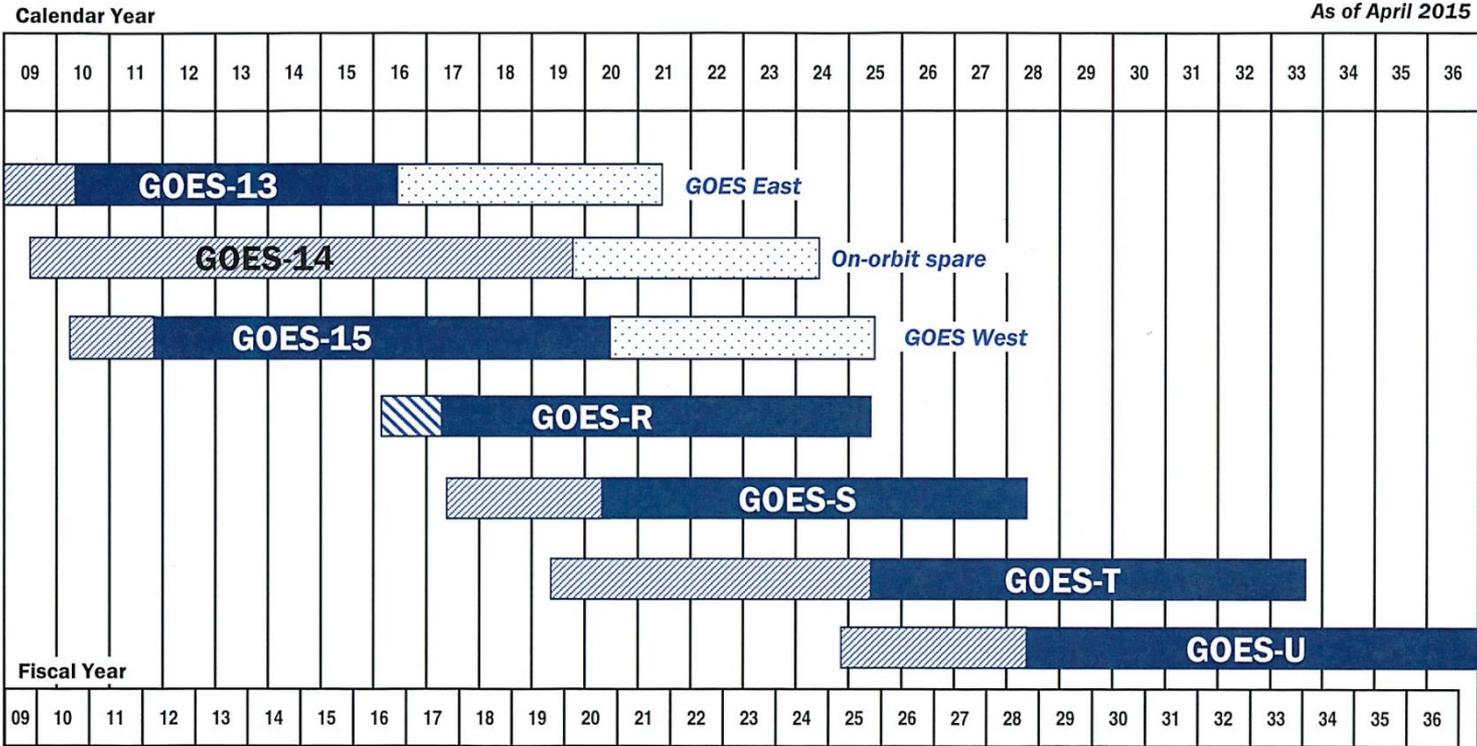
Approved: *Mark S. Puse*
Assistant Administrator for Satellite and Information Services

Note: Extended operations are reflected through the current FY, based on current operating health.

DMSP: Defense Meteorological Satellite Program
JPSS: Joint Polar Satellite System Program
Suomi NPP: Suomi National Polar-orbiting Partnership
Note: DoD and EUMETSAT data provided for reference only

- Post Launch Test
- Operational based on design life
- Secondary
- Operational beyond FY 2036
- Extended mission life
- Launched before Oct 2008

GOES Flyout Chart



Approved: Stephen B. [Signature] 4/21/2015
 Assistant Administrator for Satellite and Information Services

GOES: Geostationary Operational Environmental Satellite

- On-orbit Storage
- Test & Checkout
- Operational
- Fuel-Limited Lifetime



NOAA's Established LEO and GEO Platforms

- From Low Earth Orbit
 - The five (5) satellite combination of JPSS + Polar Follow-On (PFO) will establish NOAA's LEO coverage in the afternoon orbit well into the 2030s
 - Cooperative agreements with EUMETSAT and DMSP (near term) establishes the global polar constellation
- From Geostationary Orbit
 - The four (4) satellite combination of GOES-R through -U, continues the GOES-N/O/P series and provides the US continental coverage well into the 2030s
 - Cooperative agreements with EUMETSAT and JMA establishes the global geostationary constellation
- Together, these platforms have and will form the backbone of our observing network for the coming decades
 - To which we will add measurements from other sources to improve our NWP performance



Next-Generation JPSS and GOES-R

JPSS

- **CrIS:** significantly improved temperature and water vapor information than POES HIRS
- **ATMS:** improved global coverage and spatial resolution than AMSU
- **VIIRS:** superior imagery and more spectral bands than AVHRR
- **OMPS:** improved spatial resolution, coverage and vertical profiling than SBUV
- **CERES* and TSIS**:** for fundamental energy budget climate measurements

GOES-R

- **ABI:** superior imagery and more spectral bands than the GOES imager
 - Improved temporal sampling, CONUS every 5 minutes, full disk every 15 minutes and selected 1000 x 1000 km area at 30 seconds
- **GLM:** first ever geostationary lightning mapper
- **SEISS/SUVI/EXIS:** significantly improved space weather coverage
 - Monitors solar radiation, locates solar flares and coronal mass ejections, detects solar irradiance

*Contributed by NASA and hosted on JPSS by NOAA

**Contributed by NOAA (for TSIS-1) and flown and operated by NASA

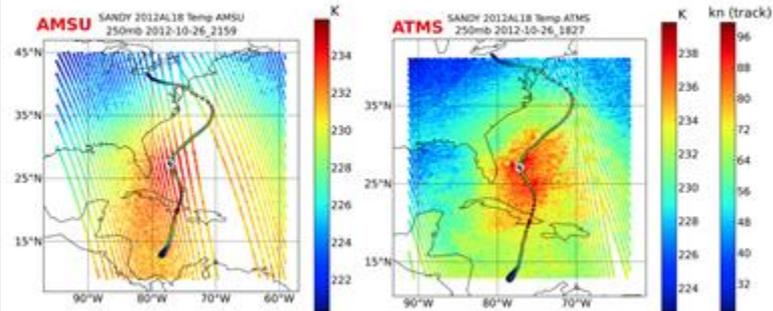
JPSS Next Generation Instruments

(all measurements are being conducted now on Suomi-NPP)

Advanced Technology Microwave Sounder

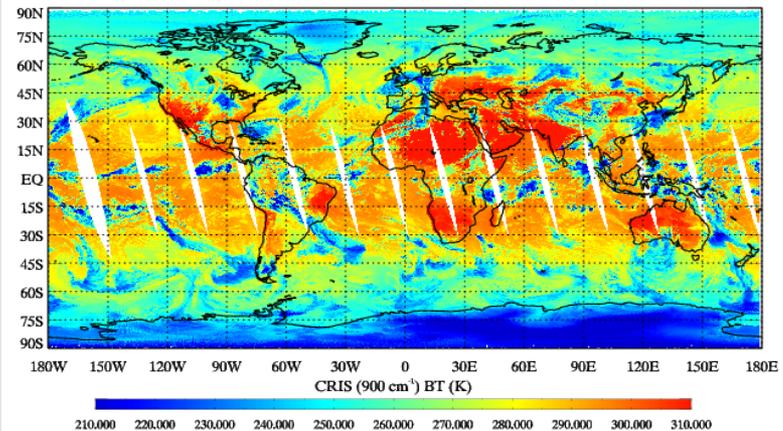
Cross-track Infrared Sounder

Resolution: ATMS vs AMSU



Higher resolution, wider swath, smaller gaps

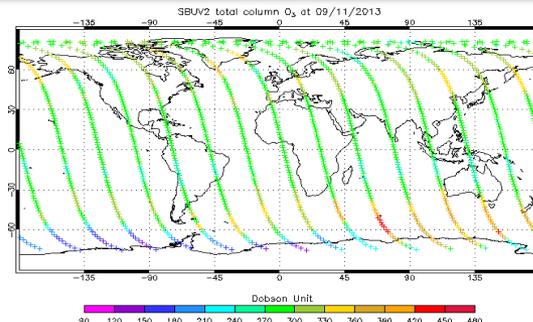
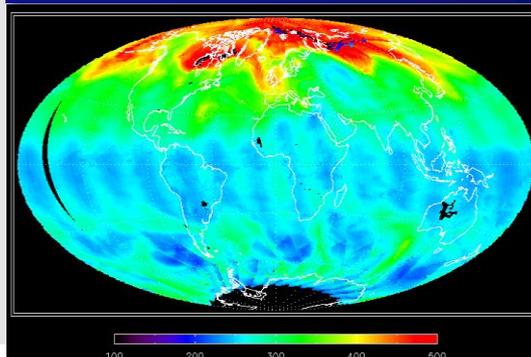
Ascending_orbits: CRIS (900 cm⁻¹) BT (K) Date: 2012-04-29



6x more vertical resolving power

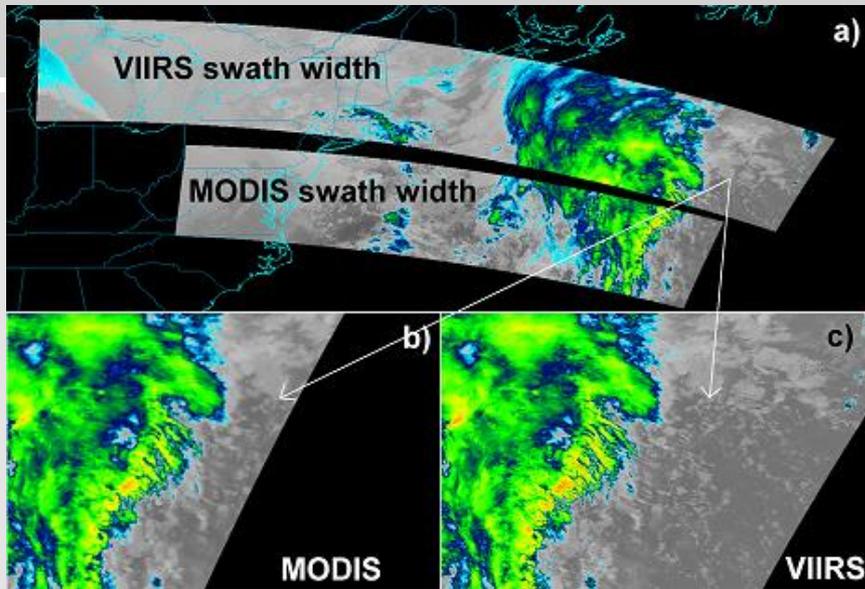
Ozone Mapping Profiler Suite

Resolution: OMPS vs SBVU/2

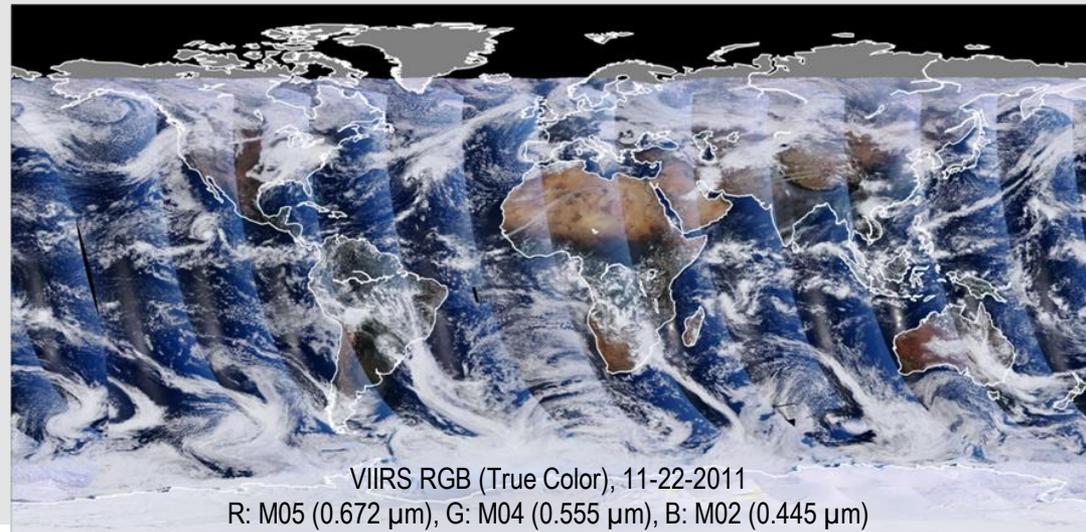
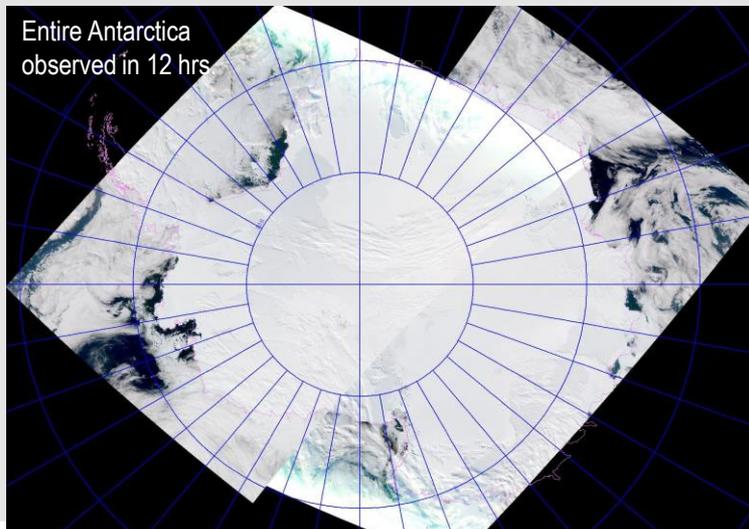
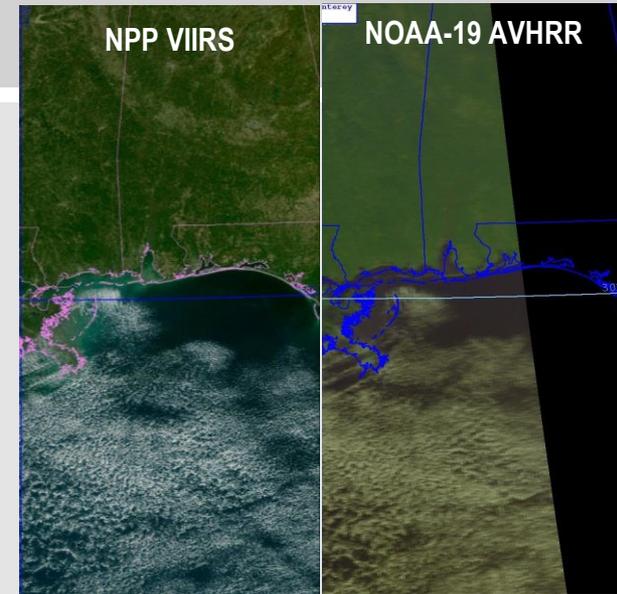


Provides global coverage ozone monitoring

JPSS Next Generation Instruments



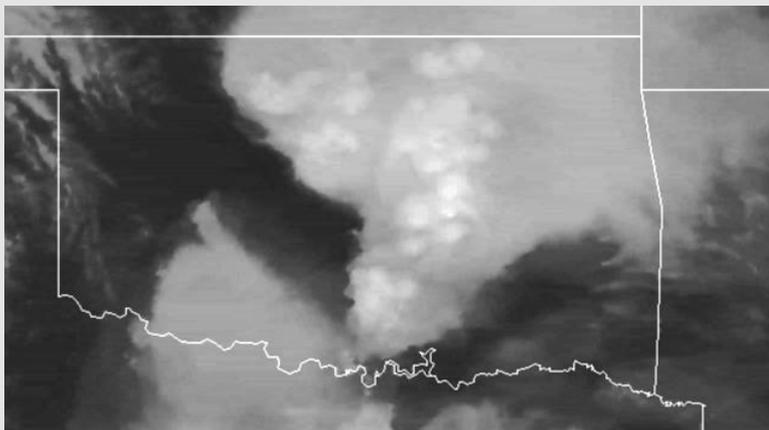
The Visible Infrared Imaging Radiometer Suite offers more spectral bands, higher resolution, wider swath and greater accuracy, resulting in a large number of products.



GOES-R Next Generation Instruments

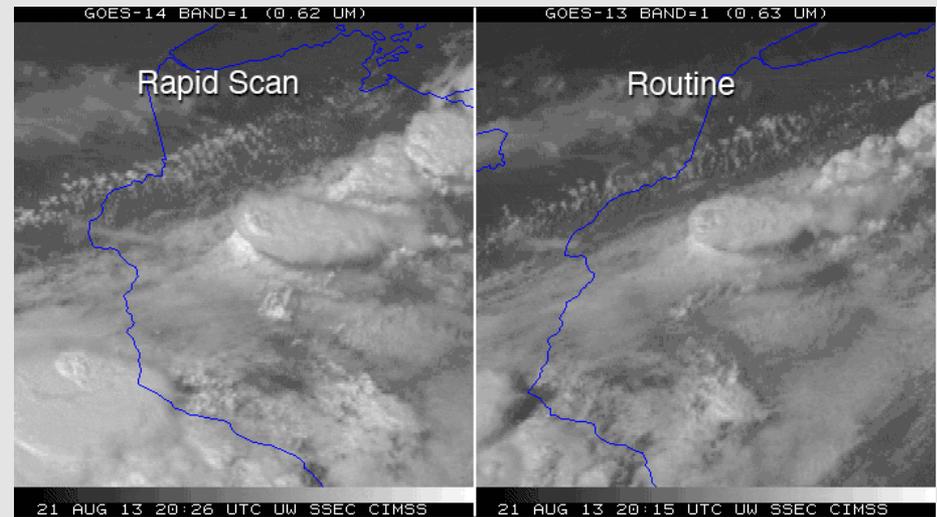
Geostationary Lightning Mapper

- GLM is a near-infrared instrument that maps total lightning
- For the first time, scientists will be able to detect cloud-to-cloud lightning
- Rapid increase in cloud-to-cloud lightning, called a “jump signature,” has been shown to precede severe weather on the ground
- Lightning observations will enable meteorologist to better track storm development and intensification



Simulation of GLM lightning detection capabilities during tornado outbreak in Oklahoma

Advanced Baseline Imager

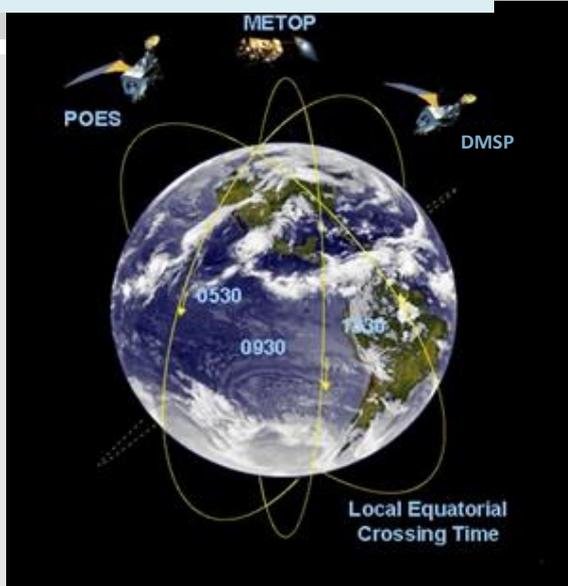


NOAA operated GOES-14 in an experimental rapid scan one-minute mode to simulate ABI capabilities in 2012 and 2013

- Primary instrument on GOES-R
- Five times faster imaging
- Four times the spatial resolution
- More accurate calibration
- New products for severe weather forecasting, volcanic ash advisories and fire and smoke monitoring

Other NOAA/Partner Satellite Missions

w/USAF, EUMETSAT & JAXA



JPSS and Metop: Complementary Orbits

JPSS program implements U.S. civil commitment, interagency and international agreements to afford 3-orbit global coverage.

Following COSMIC, the GNSS-RO mission will provide global radio-occultation measurements of ionosphere, temperature and water vapor information for weather and climate applications.

JASON-3 will continue the legacy of altimetry measurements of sea-level, along with supporting ocean circulation modeling and hurricane intensity predictions.

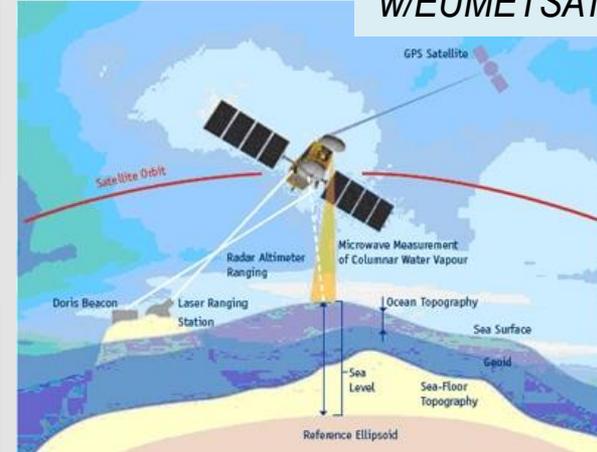
DSCOVR will provide space weather observations from L1 orbit for up to 60 minute lead time and maintain the nation's solar wind observations.

w/NSPO & USAF



GNSS-RO Launch: 2016

w/EUMETSAT



Jason-3 Launch: July 2015

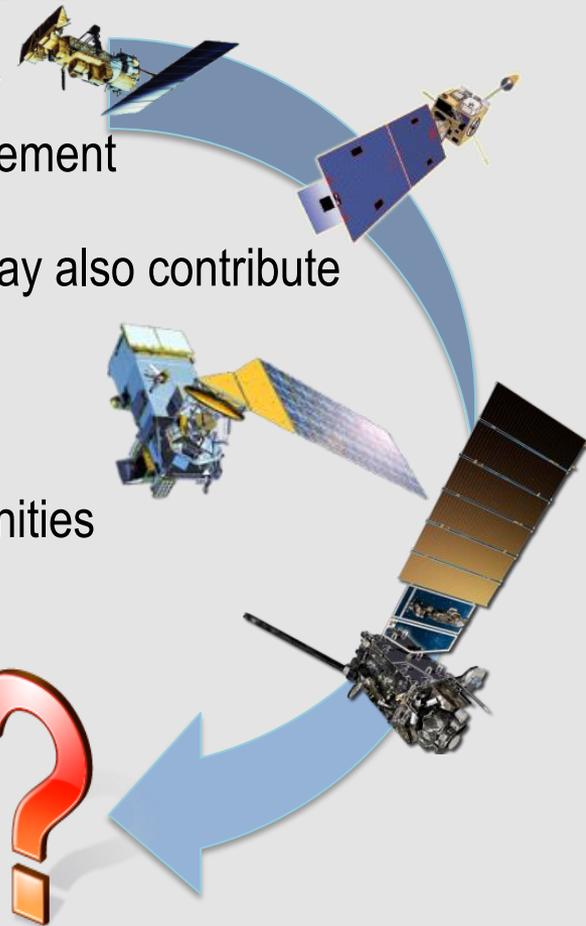
w/NASA



DSCOVR Launched: 11 Feb 2015

What's Next?: Moving Beyond "Two Orbits"

- We are broadening our "polar satellite" LEO perspective
 - Core POES/JPSS satellites through ~2038 augmented with:
 - Cosmic-2 RO mission, Earth Observing Nanosatellite-MW
 - Additional complementary evolving and emerging measurement capabilities
 - Smallsats or hosted payloads, alone or in constellation, may also contribute
- We will also broaden our GEO perspective
 - GOES-R series through ~2036, may augment with others:
 - Alternative architectures, including hosted payload opportunities
 - Possibly to include alternative orbits
- Increasingly, the services we provide will be driving towards more integrated data products, merging:
 - Across platforms, both LEO and GEO
 - Across Agencies, using observations from multiple sources
 - Across public-private domain



2016 Initiatives for NOAA/NESDIS

- Funds the Polar Follow On (PFO), to build and deploy the PFO/JPSS-3 and PFO/JPSS-4 and complete the polar satellite time series through late 2030s
- Starts studies of the next Operational Space Weather monitoring mission, to follow DSCOVR, and funds the 2nd set of COSMIC-2 sensors
- Enables continued development of systems engineering and enterprise ground capabilities to integrate the GOES-R and JPSS operations into the other NOAA satellite operations
- Lays the groundwork for the next generation architecture development for LEO, GEO, and Space Weather constellations





Questions?

